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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/943,961	08/31/2001	Bruno P.B. Lequesne	DP-304183	1539

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DELPHI TECHNOLOGIES, INC.
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EXAMINER

LEYKIN, RITA

ART UNIT PAPER NUMBER

2837

DATE MAILED: 11/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/943,961

Applicant(s)

LEQUESNE ET AL.

Examiner

Rita Leykin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 27-54 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 27-54 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This office action is in response to document filed on 12/30/03.

Provided remarks and amendment have been fully considered, but found not convincing. It appears that clarifications of limitations in newly provided claims do not put the application in position for allowance. The additional search has been provided and pertinent art has been found, although the examiner is rejecting the application based on previously provided prior art documents as follows.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 28, 29, 32-35, 37, 38, 41-44, 46, 47, 50-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jung US # 6,411,060 and Lajsner et al. US # 6,448,736.

With respect to claims 28, 29, 35, 37, 38, 46, 47, 53 Jung discloses driving device for a Switched Reluctance (SR) Motor, wherein at an initial stage of starting of switched reluctance motor, microprocessor sequentially outputs a plurality of control signals, thereby aligning the rotor. Wherein, the plurality of transistors are at an ON state for a sufficient time according to the control signals, so that the rotor can be pulled to a silent pole of the stator, in other words holding position. And wherein, the

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microprocessor sequentially outputs the control signals in consideration of the rotational direction of the rotor after starting the SR motor, (see abstract and column 7, lines 30-48).

With respect to claims 32-34, 41-44, 50-52, Jung does not teach excitement sequence of specifically second phase of the motor or third phase of the motor.

However, Jung teaches a microprocessor for sequentially outputting a plurality of control signals at an initial stage of the starting of the SR motor and sequentially outputting plurality of control signals according to the detected position after starting SR motor, wherein the plurality of transistor switches of the driving circuit is being switched by the plurality of control signal.

Jung teaches that operational control of the motor during starting is performed without the detecting of a phase position of the rotor. Jung does not teach subsequent operational control without position sensor. However, Lajsner et al. disclose a switched reluctance motor with a first phase and a second phase that is comprising aligning the rotor with the second phase, at a first time point (t_1), energizing the first phase 1, monitoring an increase of the phase current (I_1) in the first phase (1) until the phase current will reach the maximum (302), monitoring a decrease (303) of the first phase current (I_1) until at the second time point (t_2) the phase current (I_1) reaches a minimum (304) and starts to increase again (305); de-energizing the first phase (1) at a third time point (t_3) that follows the second time point (t_2) at a predetermined time interval and repeating energizing, monitoring and de-energizing for the second phase (2) instead of

the first phase (1). Hence, Lajsner et al. disclose method for controlling the switched reluctance motor based on phase current data, without use of position detector.

Hence, it has been obvious to one of ordinary skills in the art, at the time invention was made to use teachings of Lajsner et al. on sensorless SR motor control, based on current detecting, and apply this teaching to Jung disclosure of operational Switched Reluctance motor control to drive the motor in a predetermined sequence that is synchronized with the angular position of the rotor relative to the stator.

The reason is to achieve knowledge of relative position of rotor to the stator for the operational controller for instance during a "start-up" operation.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 30, 31, 36, 39, 40, 45, 48-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jung US # 6,411,060, and Lajsner et al. US # 6,448,736, and McCann US # 6,075,332.

The limitations of the independent claims have been discussed in the paragraph above.

Jung and Lajsner et al. do not teach minimizing current or heating losses. Jung and Lajsner et al. also do not teach means for determining motor torque.

However, McCann teach that higher motor current results in lower operational efficiency and greater thermal heating. Modifying the conduction angles and providing the adequate minimum amount of required time response can achieve the greater motor efficiency. Wherein, the optimum conduction angles can be determined by using a predictive signal processing techniques to estimate motor torque that will be commanded. McCann discloses a predictive conductive angle motor control system for the brake-by-wire application. Wherein, McCann introduces predictive techniques, to estimate the value of the motor torque request, (see column 1, lines 62-67 and column 2, lines 1-18 and column 6, lines 47-65).

Hence, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine teachings of Jung and Lajsner et al. and McCann to provide a controlling current losses device in Switched Reluctance motors, by reducing period of application of the phase current according to the predicted torque.

The reason is to minimize current and heating losses in the motor phase.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rita Leykin whose telephone number is (571)272-2066. The examiner can normally be reached on Monday-Friday 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Martin can be reached on (571)272-2107. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Rita Leykin
Primary Examiner
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A handwritten signature in black ink, appearing to read "Rita Leykin", written in a cursive style.

R.L.